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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/809,567	03/25/2004	Chih-Yu Chao	250323-1060	7970
24504	7590	04/19/2005	EXAMINER	
THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP			MARKHAM, WESLEY D	
100 GALLERIA PARKWAY, NW			ART UNIT	
STE 1750			PAPER NUMBER	
ATLANTA, GA 30339-5948			1762	

DATE MAILED: 04/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/809,567

Applicant(s)

CHAO ET AL.

Examiner

Wesley D. Markham

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 14 February 2005.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,2 and 5-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 5-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Response to Amendment*

1. Acknowledgement is made of the amendment filed by the applicant on 2/14/2005, in which the specification of the instant application was amended, Claims 1, 2, 6, 8 – 11, and 13 were amended, Claims 3 and 4 were canceled, and Claims 15 – 19 were added. **Claims 1, 2, and 5 – 19** are currently pending in U.S. Application Serial No. 10/809,567, and an Office action on the merits follows.

### *Priority*

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d) (i.e., the certified copy of Taiwanese priority document 92117480, filed on 6/26/2003), which papers have been placed of record in the file.

### *Oath/Declaration*

3. The objection to the declaration, set forth in paragraph 3 of the previous Office action (i.e., the non-final Office action mailed on 8/23/2004), is withdrawn in light of the applicant's remarks (see page 7 of the applicant's 2/14/2005 response) in which the applicant correctly noted that, according to 37 CFR 1.63, the declaration is only required to identify the inventors as "original" and "first", not "sole" or "joint" as was previously required.

***Drawings***

4. The objection to the drawings, set forth in paragraph 5 of the previous Office action, is withdrawn in light of the applicant's amendment to add reference numbers "112" and "208" to the specification. As such, the formal drawings (3 sheets, 6 figures) filed by the applicant on 3/25/2004 are approved by the examiner.

***Specification***

5. The objections to the specification, set forth in paragraph 6 of the previous Office action, are withdrawn in light of the applicant's amendment to correct the informalities noted by the examiner.

***Claim Objections***

6. The objections to Claims 2, 6, 9, and 13, set forth in paragraph 7 of the previous Office action, are withdrawn in light of the applicant's amendments to correct the informalities noted by the examiner.

***Claim Rejections - 35 USC § 112***

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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8. Claims 8, 9, and 12 – 14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
9. As amended, independent **Claim 8**, from which **Claims 9 and 12 – 14** depend, recites performing various steps with “a polarizer material” (e.g., forming a polarizer material on a dip-pen, transferring the polarizer material to a base, etc.). This limitation renders Claims 8, 9, and 12 – 14 vague and indefinite because it is unclear what materials are encompassed by the term “polarizer material”. The aforementioned term is not defined in the applicant’s specification, and in fact, was not originally used at all in the applicant’s specification. Further, the term does not appear to have an art-recognized definition. Therefore, while it is clear that dichroic and/or birefringent materials qualify as “polarizer materials” (see, for example, Claims 10 and 11), one skilled in the art would not be reasonably apprised of what other materials fall within the bounds of the claimed “polarizer material”, and the scope of Claims 8, 9, and 12 – 14 is indeterminate. Please note that Claims 10 and 11 have not been rejected on this basis because Claims 10 and 11 explicitly recite that the polarizer material is a dichroic material (Claim 10) or a birefringent material (Claim 11).

***Claim Rejections - 35 USC § 103***

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

12. Claims 1, 2, and 5 – 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Khan et al. (USPN 6,399,166 B1) in view of Noy et al. ("Fabrication of Luminescent Nanostructures and Polymer Nanowires Using Dip-Pen Nanolithography", Nano Letters, Vol.2, No.2, pages 109-112; 2002) and Piner et al. ("Dip-Pen Nanolithography", Science, Vol.283, pages 661-663, 1999).

13. Regarding independent **Claims 1, 8, and 15**, as well as dependent **Claims 2, 9, and 16**, Khan et al. teaches a polarizer manufacturing method, the method comprising depositing a pattern of different regions (i.e., by printing or photolithography) of dye material (i.e., a "polarizer material") onto a polarizer base (i.e., transferring the material to a base) and then removing the solvent associated with the material (i.e., drying and hardening the material over the base) to produce a molecularly ordered

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dye that serves as a polarizing coating (Abstract, Figures 1 – 6, reference numbers “8” and “9”, Col.3, lines 1 – 12, Col.4, lines 1 – 12, Col.7, lines 15 – 46 and 60 – 67, Col.8, lines 1 – 32, Col.9, lines 1 – 25, Col.10, lines 30 – 40 and 50 – 60, Col.11, lines 1 – 37). Khan et al. also teaches that the dye is a dichroic material (Col.3, lines 1 – 10, Col.8, lines 15 – 21, Col.10, lines 30 – 40), as required by Claim 1 and **Claim 10**, and the dye material of Khan et al. has a liquid crystalline structure / phase (Abstract, Col.3, lines 11 – 12, Col.4, lines 1 – 3, Col.7, lines 15 – 17) and can also include a liquid crystalline polymer (Col.7, lines 34 – 37). Therefore, the dye / polarizer material of Khan et al. is “birefringent” (see, for example, Yamahara et al. (USPN 5,506,706) (Col.3, lines 46 – 50, Col.4, lines 19 – 23, Col.5, lines 22 – 23), which is cited simply to show that liquid crystalline materials are, in fact, birefringent), as required by Claim 15 and **Claim 11**. Khan et al. does not explicitly teach that the different regions (pattern) of the dye material on the base are applied by placing the material (e.g., the dye) on a dip-pen and bringing the dip-pen into contact with the polarizer base to transfer the material to the base. However, Khan et al. explicitly teaches that, “Using the methods of photolithography or printing techniques for the application of dyes, and using dyes of various colors, a polarizing layer with differently colored regions can be formed” (Col.9, lines 21 – 24). Noy et al. teaches that it was known in the art at the time of the applicant’s invention to (1) place a material, specifically a dilute dye solution, on a dip-pen, and then (2) bring the dip-pen into contact with a base (e.g., glass) in order to transfer the dye to the base in a desired pattern or configuration (Abstract, Figure 1, and page 109). This

patterning method is known as dip-pen nanolithography, or DPN (page 109, col.1). Noy et al. teaches that the DPN method is ideally suited to fabricate surface patterns (page 109, col.1). Additionally, Piner et al. teaches that, when compared to conventional pattern forming methods such as lithography (i.e., a method explicitly taught by Khan et al.), DPN has the following advantages: (1) it can deliver relatively small amounts of material to a substrate, (2) it does not rely upon complicated processing methods or sophisticated non-commercial instrumentation, and (3) it is less expensive (page 661, last column, page 662, first line, and page 663, last paragraph). Therefore, it would have been obvious to one of ordinary skill in the art to deposit the desired pattern of different regions of dye material(s) in the polarizer production process of Khan et al. by using DPN (i.e., placing a material (the dye solution) on a dip-pen, and then bringing the dip-pen into contact with a base in order to transfer the dye to the base, as taught by Noy et al. and Piner et al.) prior to removing the solvent from the applied dye material (thereby drying / hardening the dye) with the reasonable expectation of (1) success, as Noy et al. teaches that DPN can be utilized to deposit a dye pattern on a substrate such as glass (i.e., a substrate taught by Khan et al.), and (2) obtaining the benefits of using DPN to form the desired regions of dye(s), such as performing the process more simply and economically in comparison to using the photolithographic method suggested by Khan et al. Regarding **Claims 5, 12, and 17**, the combination of Khan et al., Noy et al., and Piner et al. also teaches that the dip-pen is a tip of an atomic force microscope (AFM) (Noy et al., page 109; Piner et al., page 661, col.1). Regarding



**Claims 6, 13, and 18**, the combination of Khan et al., Noy et al., and Piner et al. also teaches that the material is transferred to the polarizer base by capillarity (Abstract, Figure 1, and page 662, second full paragraph, of Piner et al., which teaches that DPN transfers material to a substrate surface by capillary action). Regarding **Claims 7, 14, and 19**, Khan et al. also teaches that a transparent macromolecule material or glass is used to form the polarizer base (reference numbers "1" and "2"; Col.7, lines 60 – 62, Col.10, lines 55 – 59).

### ***Response to Arguments***

14. Applicant's arguments filed on 2/14/2005 have been fully considered but they are not persuasive.
15. Regarding the 35 U.S.C. 103(a) rejections based on the combination of Khan, Noy, and Piner, the applicant argues that Khan does not teach using a dip-pen to transfer the polarizer material to a polarizer base, and instead only discloses using a squeegee moved along the plate surface to arrange the direction of the polarizer material molecule.
16. In response, this argument is not convincing. First, please note that the examiner has not relied upon Khan to teach using a dip-pen to transfer the polarizer material to a polarizer base – it is the combination of Khan, Noy, and Piner (not Khan alone) that renders the applicant's claimed invention obvious. One cannot show non-obviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA

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1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Additionally and regarding the applicant's statement that "Khan only disclosed using a squeegee moved along the plate surface to arrange the direction of the polarizer material molecule", this statement does not appear to be completely accurate.

Specifically, Khan explicitly teaches that, "Using the methods of photolithography or printing techniques for the application of dyes, and using dyes of various colors, a polarizing layer with differently colored regions can be formed" (Col.9, lines 21 – 24).

Additionally, the polarizer material (dye) of Khan can be properly oriented by (1) rubbing the surface of the film on which the polarizer material is deposited (Col.8, lines 15 – 18), or (2) mechanically stretching the layer during or after the deposition (Col.9, lines 5 – 8). Therefore, Khan teaches a number of methods of depositing and orienting the polarizer material other than using a squeegee as asserted by the applicant.

17. Second, the applicant argues that it would not have been obvious for a person of skill in the art to infer that a polarizer material could be transferred from a dip-pen to a polarizer base. To support this position, the applicant cites paragraph 2 of Noy, which, according to the applicant, teaches that not all material can be transferred from a dip-pen to a sample.

18. In response, this argument is not convincing. The examiner has reviewed paragraph 2 of Noy, which simply states that the feature size in DPN is determined by, among other things, the chemical nature of the ink. This statement does not teach or suggest that "not all material can be transferred from a dip-pen to a sample", as

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argued by the applicant. Further, the examiner has not argued or asserted that one of ordinary skill in the art would expect all materials to be successfully transferred from a dip-pen to any substrate, only that one would have had a reasonable expectation of success in using a dip-pen to transfer the dichroic / birefringent dye material of Khan et al. to a polarizer base. The examiner's position is supported by the teaching of Noy that DPN can be utilized to deposit a dye pattern on a substrate such as glass. Since the polarizer material of Khan et al. is a dye, and the substrate taught by Khan et al. is glass, one of ordinary skill in the art would have reasonably expected a dip-pen to successfully transfer a pattern of the polarizer material of Khan et al. to the polarizer base, as claimed by the applicant. Please note that obviousness does not require absolute predictability (*In re Rinehart*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976)).

19. Third, the applicant argues that Khan teaches using a mechanically stretching force to arrange the molecule, but the dip-pen method does not generate such a stretching force. Therefore, if one of ordinary skill in the art wants to arrange a molecule by stretching, he would not infer using a dip-pen to transfer the polarizer material to a polarizer base.

20. In response, this argument is not convincing. Khan explicitly teaches that, "Using the methods of photolithography or printing techniques for the application of dyes, and using dyes of various colors, a polarizing layer with differently colored regions can be formed" (Col.9, lines 21 – 24). Additionally, the polarizer material (dye) of Khan can be properly oriented by (1) rubbing the surface of the film on which the polarizer

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material is deposited (Col.8, lines 15 – 18), or (2) mechanically stretching the layer during or after the deposition (Col.9, lines 5 – 8). Therefore, Khan teaches a number of methods of depositing and orienting the polarizer material other than using a mechanically stretching force. For example, a photolithography technique, as taught by Khan et al., does not require a stretching force to arrange the dye. Neither does rubbing the surface of the film on which the polarizer material is deposited, as also taught by Khan et al. Additionally, the stretching taught by Khan et al. can be performed after the deposition – the method of deposition (e.g., the dip-pen) is not required to provide or generate the stretching force, as inferred by the applicant. Therefore, one of ordinary skill in the art would have reasonably expected to obtain the desired polarizer / dye orientation by (1) rubbing the surface of the film on which the dye is to be deposited prior to deposition, or (2) stretching the film comprising the deposited dye, as taught by Khan et al., regardless of whether the dye is deposited by photolithography or printing techniques (as taught by Khan et al.) or DPN (as taught by Noy and Piner).

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wesley D. Markham whose telephone number is (571) 272-1422. The examiner can normally be reached on Monday - Friday, 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tim Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

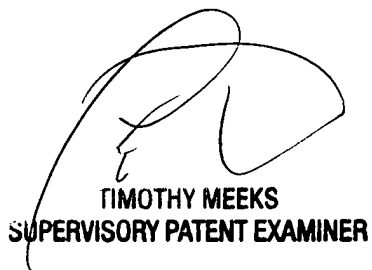
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